Engineering Exhibit
WMZQ-FM, Washington, DC
Facility ID No: 73305
AMFM Radio Licenses, L.L.C.
Application to Modify Auxiliary Antenna License
BXLH-20020227AAY

Introduction

The purpose of this application is to provide for simultaneous operation of WMZQ-FM and WBIG-FM from the shared auxiliary antenna. A correction to the WMZQ-FM "transmitter power output" is necessary as a result of the insertion loss of the combiner. The auxiliary antenna specified herein is licensed for "single station" operation by WMZQ-FM, WBIG-FM, WASH(FM), WIHT(FM) and WWDC(FM). A two-station combiner was installed to facilitate combined operation of WMZQ-FM and WBIG-FM only. A switching network is installed which allows continued "single station" operation of WASH(FM), WIHT(FM) or WWDC(FM) (one station at a time), but combined operation is only possible for WBIG-FM and WMZQ-FM. An application is also being filed to modify the WBIG-FM auxiliary license to reduce the ERP to facilitate the combined operation.

This existing auxiliary antenna is mounted on the center tower of AM station WWRC but no changes to the antenna or any appurtenances upon the tower have or will be made as the result of this proposal. As a result, this proposal will have NO IMPACT upon the operation of the WWRC(AM) directional antenna system.

Radio Frequency Radiation Study and Statement:

The proposed facilities were evaluated in terms of potential radio frequency radiation exposure at ground level in accordance with OET Bulletin No. 65, "Evaluating Compliance With FCC-Specified Guidelines for Human Exposure to Radio Frequency Radiation".

This antenna will serve as a shared auxiliary antenna for WMZQ-FM and WBIG-FM in a combined operation. The antenna system is an ERI model SHPX-6AC-HW, 6-bay half-wave spaced "rototiller" antenna with its center of radiation 170 meters above ground level, and will operate with a combined effective radiated power of 8.3 kilowatts in both the horizontal and vertical planes. At 2 meters, the height of an average person, at 1004 meters from the base of the tower, this proposal will contribute worst case, 0.22 microwatts per square centimeter, or 0.022 percent of the allowable ANSI limit for controlled exposure, and 0.11 percent of the allowable limit for uncontrolled exposure.

This site is shared with AM station WWRC which operates with a power of 5.0 kW (DA-2) in both daytime and nighttime modes utilizing a three tower in-line directional antenna

array. The array consists of two 90° towers on each end with a taller tower, 230 meters in height at the center of the array, on which the auxiliary FM antenna is mounted. The upper section of the taller center tower is detuned to produce a radiator with an equivalent electrical height of 90°, thus the center tower was evaluated assuming an electrical height of 90°. To determine the level of RF exposure for WWRC, values from Figures 2 of "Supplement A (Edition 97-01) to OET Bulletin 65 (Edition 97-01)" were used to determine the predicted E-field and H-field values at the nearest point on the fence that surrounds each tower for a power level of 1.0 kW. These values were multiplied by the square root of 5 since the authorized power is 5.0 kW, thus providing a conservative "worst case" prediction assuming that all transmitted power is radiated from each of the three towers. The minimum distance from any of the three towers to the nearest point on the fence surrounding the tower is 5.3 meters. The predicted E-field at this distance for a power of 5.0 kW is 28.0 V/m, which corresponds to a Plane-wave equivalent power density of 0.21 mW/cm², or 0.21 % of both the General Population/Uncontrolled and the Occupational/Controlled Exposure Limit of 100 mW/cm² at the WWRC operating frequency of 1260 kHz. The predicted H-field for a power of 5.0 kW is 0.335 A/m, which corresponds to a Plane-wave equivalent power density of 4.24 mW/cm² or 4.24 % of the Exposure Limit.

The taller center tower also supports the main antenna for WWDC(FM). This antenna system is an ERI 4-bay full-wave spaced "rototiller" antenna with its center of radiation 232 meters above ground level, and operates with an effective radiated power of 22.5 kilowatts in both the horizontal and vertical planes. At 2 meters, the height of an average person, at 91 meters from the base of the tower this facility will contribute worst case, 2.67 microwatts per square centimeter, or 0.27 percent of the allowable ANSI limit for controlled exposure, and 1.34 percent of the allowable limit for uncontrolled exposure.

Since the RF Radiation values attributable to the combined auxiliary antenna for WMZQ-FM and WBIG-FM, the operation of AM station WWRC and the operation of WWDC(FM) are all less then 5% of the respective General Population/Uncontrolled Exposure limits, the site does comply with OET Bulletin 65 Edition 97-01 with regard to both General Population/Uncontrolled and Occupational/Controlled Exposure as required by the Federal communications Commission.

Further, warning signs are posted in the vicinity of all towers warning of potential radio frequency hazards at the site. The site itself is restricted from public access. The applicant will cooperate with other users of the tower to reduce power of the facility or discontinue operation as necessary to limit human exposure to levels less than specified by the Federal Communications commission should anyone be required to climb the tower for maintenance or inspection.

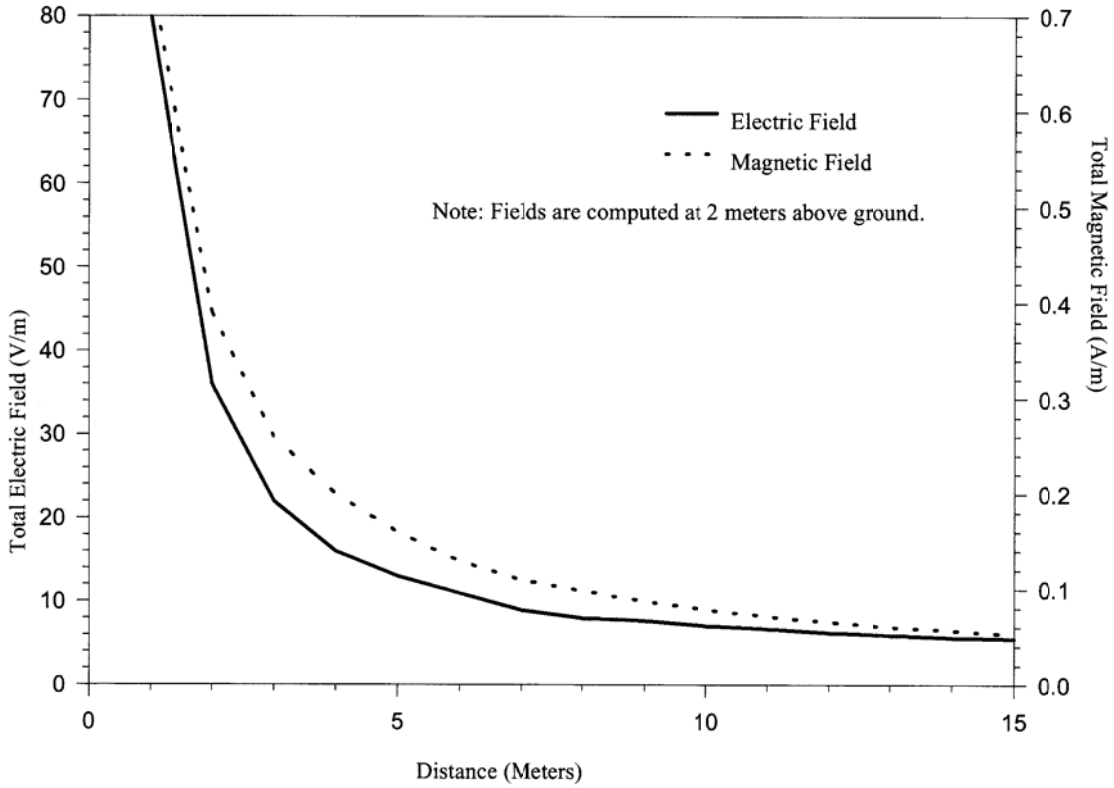


Figure 2. **MININEC AM Model for 1 kW, 0.25 Wavelength Tower**

ELECTRONICS RESEARCH, INC.
7777 GARDNER ROAD
CHANDLER, IN. 47610

FIGURE 2

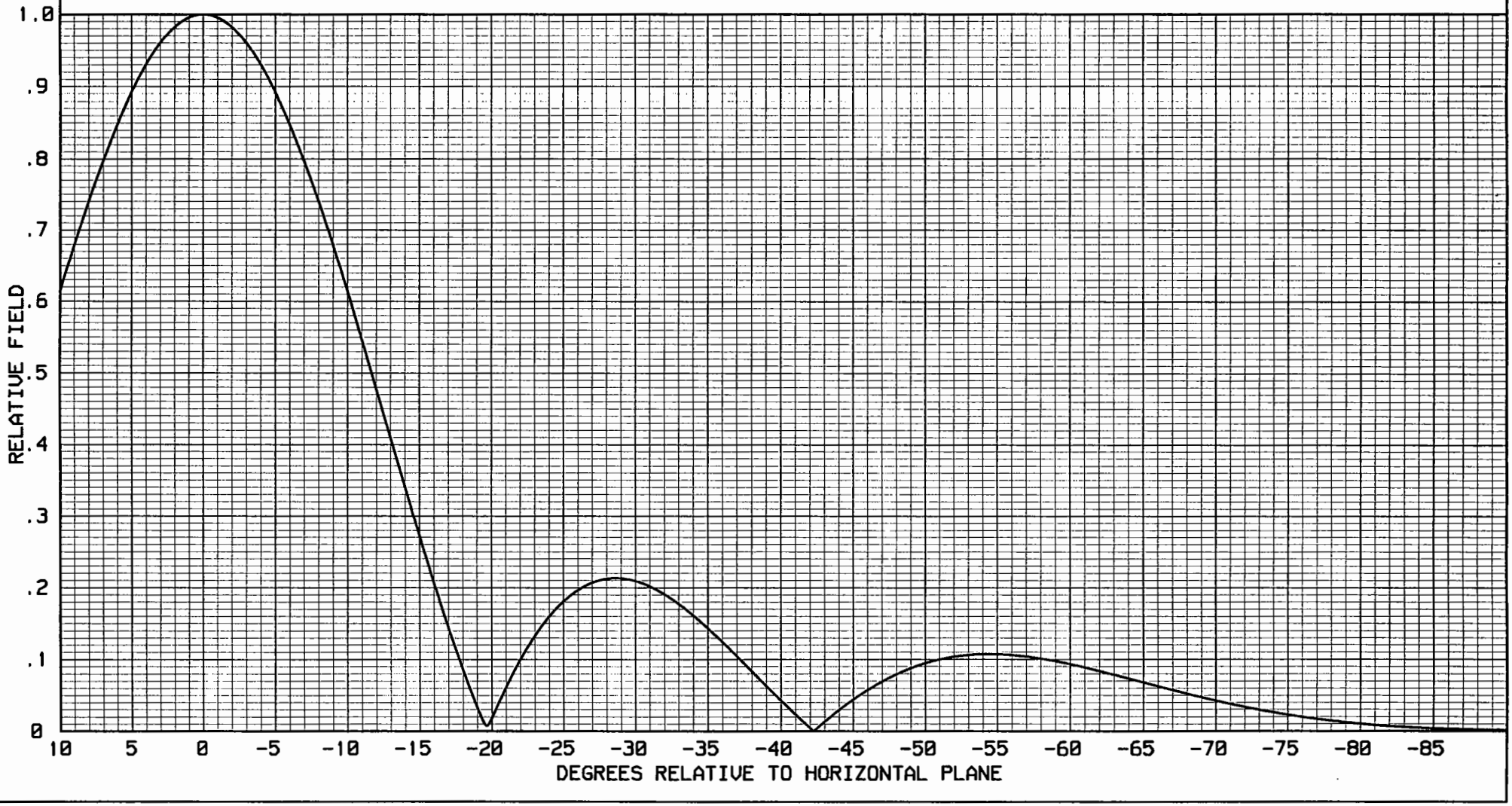
----THEORETICAL----
VERTICAL PLANE RELATIVE FIELD

6 ERI TYPE SHP, SHPX, LP, OR LPX ELEMENTS
+0.00 DEGREE(S) ELECTRICAL BEAM TILT
1 PERCENT FIRST NULL FILL
0 PERCENT SECOND NULL FILL
POWER GAIN IS 1.905 IN THE HORIZONTAL PLANE(1.905 IN THE MAX.)

JANUARY 20, 2000

98.7 MHz

ELEMENT SPACING
59.3125 INCHES



Occupied Bandwidth and Spurious Emissions Measurements

To Demonstrate Compliance with Section 73.317(b) through 73.317(d) of the FCC Rules and Regulations

AMFM Radio Licenses, L.L.C.
WBIG-FM – 100.3 MHz
Washington, DC (Facility ID No: 54459)
WMZQ-FM – 98.7 MHz
Washington, DC (Facility ID No: 73305)

June 13, 2007

Occupied Bandwidth and Spurious Emissions Measurements

Measurements were conducted to demonstrate that WBIG-FM, Washington, DC and WMZQ-FM, Washington, DC operating into a combined auxiliary antenna system, comply with section 73.317(b) through 73.317(d) of the FCC Rules and Regulations. Randall L. Mullinax conducted the measurements on June 13, 2007, with both stations simultaneously utilizing the shared auxiliary antenna. The spectrum analyzer used for the measurements was an Agilent Technologies model E4402B, S/N MY41441731. A sample of the WBIG-FM and WMZQ-FM signals was derived from the main transmission line at the output of the combiner and was coupled to the analyzer using a short length of RG-223 50Ω double-shielded coaxial cable. Two 6 dB pads (Bird model 5-A-MFN-06) were inserted ahead of the analyzer to avoid overload and to provide isolation.

The measured unmodulated carrier level of both stations was +2 dBm and was used as the reference for all harmonic, spurious and intermoduation measurements. All measurements were conducted with the transmitters and associated equipment adjusted as used in normal program operation.

For all occupied bandwidth measurements, the spectrum analyzer was placed in the peak hold mode for at least 10 minutes per measurement before the waveforms were observed. As shown in Figures 1, 2 and 3, all transmitters were observed to be in full compliance with section 73.317(b) of the FCC Rules with emissions appearing on frequencies removed from the carrier frequencies by between 120 kHz and 240 kHz attenuated by at least 25 dB below the unmodulated carrier level indicating the occupied bandwidth of each transmitter to be 240 kHz or less. All transmitters were also observed to be in full compliance with section 73.317(c) of the FCC Rules with emissions appearing on frequencies removed from the carrier frequencies by between 240 kHz and 600 kHz attenuated by at least 35 dB.

Figure 1
WBIG-FM

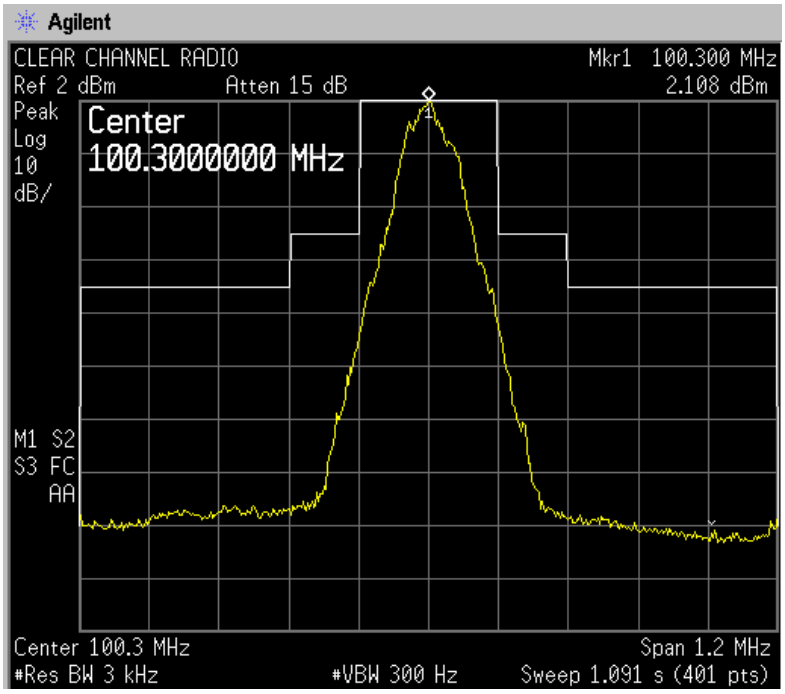
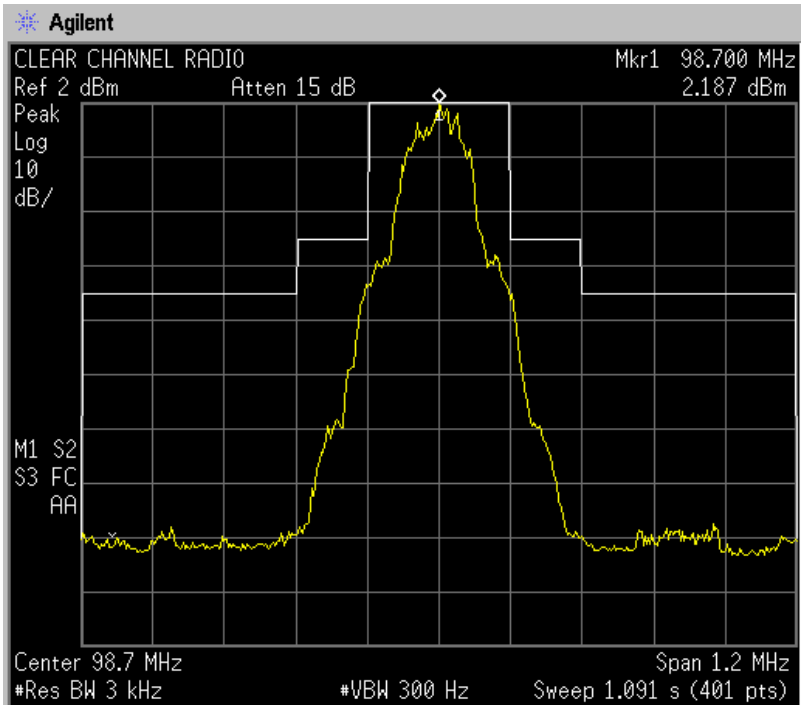


Figure 2
WMZQ-FM



Extensive measurement were also conducted to insure that emissions appearing on frequencies removed from the carrier frequencies by more than 600 kHz were attenuated by at least 77.8 dB [43+10log(3000) dB] as required by section 73.317(d) of the FCC Rules for a transmitter operating with an output power of 3.0 kW (required for WMZQ, the required attenuation for WBIG-FM is 77.7 dB for a transmitter operating with an output power of 2.95 kW). To facilitate these measurements, notch filters were placed between the two 6 dB pads so that the spectrum analyzer gain could be increased by up to 20 dB. The filters were necessary to avoid the possible generation of false spurious or intermodulation products in the analyzer. The attenuation of the notch filters was 42.9 dB at 100.3 MHz and 38.9 dB at 98.7 MHz.

The most likely intermodulation frequencies in the range 3 MHz to 550 MHz that could be produced by the combined operation of WBIG-FM and WMZQ-FM and harmonic frequencies through the 5th harmonic were calculated and the results of the measurements at these frequencies are listed in Table 1.

Table 1

Frequency A	100.3
Frequency B	98.7

DESCRIPTION	FREQ. MHZ	ATTENUATION DB	DESCRIPTION	FREQ. MHZ	ATTENUATION DB
A + B	199	>100	(2 X B) + (3 X A)	498.3	>100
A + (2 X B)	297.7	>100	3 X A	300.9	>100
B + (2 X A)	299.3	>100	(3 X A) - B	202.2	>100
A + (3 X B)	396.4	>100	3 X B	296.1	>100
B + (3 X A)	399.6	>100	(3 X B) - A	195.8	>100
2 X A	200.6	>100	(3 X A) - (2 X B)	103.5	81
(2 X A) - B	101.9	>100	(3 X B) - (2 X A)	95.5	92
2 X B	197.4	>100	(3 X A) - (3 X B)	4.8	>100
(2 X B) - A	97.1	88	4 X A	401.2	>100
(2 X A) + (2 X B)	398	>100	4 X B	394.8	>100
(2 X A) - (2 X B)	3.2	>100	5 X A	501.5	>100
(2 X A) + (3 X B)	496.7	>100	5 X B	493.5	>100

Note: Attenuation values include the impact of local FM stations WASH – 97.1 MHz, WTOP – 103.5 MHz and WPGC – 95.5 MHz.

While special attention was given to the “product” frequencies listed in Table 1, measurements were conducted covering the entire range of frequencies between 3.0 MHz

and 550 MHz. The only signals detected at levels attenuated by less than 80 dB below the unmodulated carrier levels and appearing on frequencies removed from the WBIG-FM and WMZQ-FM carrier frequencies by more than 600 kHz were the carriers of nearby FM and Television stations. In each case where these signals were observed to be at a level greater than –78 dBm (80 dB below the unmodulated carrier level which was +2 dBm) the WBIG-FM and WMZQ-FM transmitters were turned off while the amplitude of the signal was observed to be unchanged, indicating that the signal was not the result of the combined operation of WBIG-FM and WMZQ-FM.

The results of these measurements confirm that the combined operations of WBIG-FM and WMZQ-FM into the shared auxiliary antenna are in full compliance with section 73.317(b) through 73.317(d) of the FCC Rules and Regulations.

Randall L. Mullinax
Regional Engineer
Clear Channel Radio